



**PRAIRIE**  
RESEARCH INSTITUTE

# **PRAIRIE LIGHTNING MINI-SYMPOSIUM**

Eleven fast-paced “lightning” talks and over 50 posters showcase the diverse work of the state scientific surveys.

**Thursday, September 20**

**Posters, networking, and refreshments 9:00 AM to 1:00 AM**

**Lightning talks 9:30 and repeated at 11:30**

**Illini Union Rooms B & C**

**[prairie.illinois.edu](http://prairie.illinois.edu)**

HOME OF THE ILLINOIS STATE SCIENTIFIC SURVEYS

Illinois Natural History Survey • Illinois State Archaeological Survey • Illinois State Geological Survey • Illinois State Water Survey • Illinois Sustainable Technology Center

 **ILLINOIS**



# Prairie Lightning *Mini*-Symposium

September 20, 2012

University of Illinois

Illini Union Rooms B & C

## Prairie Lightning *Mini*-Symposium

September 20, 2012

Illini Union Rooms B and C  
University of Illinois at Urbana Champaign  
Urbana, Illinois

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9:00 a.m. Doors open. Posters, networking, and light refreshments.

9:30-10:00 Lightning Talks – I

### ***Introduction and Welcome***

#### ***The 2012 Agricultural Drought in Illinois***

Jim Angel, Illinois State Water Survey

#### ***The Response of the Mahomet Aquifer to the 2012 Drought***

George Roadcap, Illinois State Water Survey

#### ***The ubiquitous WebGIS Analysis Toolkit for Extensive Resources (uWATER):***

#### ***Applications and Future Development***

Yu-Feng Lin, Illinois State Geological Survey

#### ***The Meaning of Bones***

Eve Hargrave, Illinois State Archaeological Survey

#### ***Why I Can't Resist Resistivity***

Tim Larson, Illinois State Geological Survey

10:00-10:15 Break. Poster session continues.

10:15-10:45 Lightning Talks – II

### ***ICRT Research and Training Efforts***

Paul Francisco, Illinois Sustainable Technology Center

#### ***It's time to start thinking...like a rootworm!***

Joe Spencer, Illinois Natural History Survey

#### ***Rediscovering a Lost City***

Joseph Galloy, Illinois State Archaeological Survey

#### ***Three-dimensional imaging and virtual dissection of fossil insects***

Sam Heads, Illinois Natural History Survey

#### ***ISTC: Many Facets, Single Focus***

Nandakishore Rajagopalan, Illinois Sustainable Technology Center

#### ***Pioneering Change from the Ground Up***

Sallie Greenberg, IGS/Advanced Energy Technology Initiative

10:45-11:30 Break. Poster session continues.

11:30-Noon Lightning Talks – I

12:00-12:15 Break. Poster session continues.

12:15-12:45 Lightning Talks – II

1:00 Adjourn

## Lightning Talks – I

(9:30 – 10:00, repeated 11:30 – noon)

Jim Angel, Illinois State Water Survey

### ***The 2012 Agricultural Drought in Illinois***

The 2012 drought is one of the more severe droughts in recent times with significant impacts on agriculture and water supplies in Illinois. The development of the drought, its impacts, and comparisons with past droughts will be covered. Finally, the impact of the remains of Hurricane Isaac will be discussed.

George Roadcap, Illinois State Water Survey

### ***The Response of the Mahomet Aquifer to the 2012 Drought***

The response of the Mahomet Aquifer to the 2012 drought has varied from region to region depending on the initial conditions and water use. In Mason County, water levels have remained near normal due to very wet conditions in 2010. In northern Champaign County, water levels have dropped dramatically due to increased irrigation.

Yu-Feng Lin, Illinois State Geological Survey

### ***The ubiquitous WebGIS Analysis Toolkit for Extensive Resources: Applications and Future Development***

One of the major challenges in scientific research is expressing complex scientific/technical concepts in easily understood terms so the concepts can more readily be used by policy makers and stakeholders to assess data and theoretical conclusions. We present two free GIS plug-ins that aid in visualizing alternative approaches for natural resource management in intuitive and simple approaches. Based on this development, a conceptual framework of utilizing WebGIS and future CyberGIS has been recently proposed to integrate 1) existing spatial and temporal databases, 2) new modeling approaches to provide faster modeling results, and 3) real-time field monitoring data continuously collected in various spatial and temporal scales.

Eve Hargrave, Illinois State Archaeological Survey

### ***The Meaning of Bones***

Perceptions of human remains vary across cultures and through time. Recent research on this topic focuses on the distribution of culturally modified human remains throughout the Midwest and how archaeological context provides insights into the changing significance of human remains in prehistory.

Tim Larson, Illinois State Geological Survey

### ***Why I Can't Resist Resistivity***

Electrical earth resistivity measurements have been the 'bread and butter' of the ISGS geophysics program for over 70 years. Today we use it for water resource, contaminant transport and geologic mapping projects. The method has many other potential uses including as a proxy for hydraulic property analysis.

## Lightning Talks – II

(10:15 – 10:45, repeated 12:15 – 12:45)

Paul Francisco, Illinois Sustainable Technology Center

### ***ICRT Research and Training Efforts***

This presentation will introduce attendees to the work of the Indoor Climate Research & Training team, new to ISTC. An introduction to the staff and facility will be provided. Descriptions of the types of training efforts that the team works on, as well as sample results of their research projects on energy efficiency and indoor environmental quality, will be discussed.

Joe Spencer, Illinois Natural History Survey

### ***It's time to start thinking...like a rootworm!***

Corn rootworm beetles are perennial cornfield pests in Illinois. Resistant rootworms plague us because our actions fail to appreciate their biology and behavior. Paying attention to what they really do is critical to improving rootworm management and delaying future resistance.

Joseph Galloy, Illinois State Archaeological Survey

### ***Rediscovering a Lost City***

Around AD 1100, the mighty American Indian city of Cahokia was the core of a larger urbanized area that included two subordinate settlements where St. Louis and East St. Louis stand today. Although archaeologists long presumed that these ancient cities were destroyed, the 480-acre East St. Louis site is partially preserved under historic-period fill. Five years of Illinois State Archaeological Survey excavations have exposed sprawling, densely populated, and amazingly well-preserved prehistoric residential neighborhoods that provide new insights into life 900 years ago in this area.

Sam Heads, Illinois Natural History Survey

### ***Three-dimensional imaging and virtual dissection of fossil insects***

Insects have a rich and extensive fossil record dating back to the Devonian some 400 million years ago, yet paleoentomology has barely scratched the surface of this valuable archive of insect evolutionary history. Nevertheless, modern imaging techniques such as phase contrast x-ray synchrotron microtomography allow ultra-high-resolution three-dimensional imaging of both internal and external morphological structures, granting unprecedented insight into the biology of ancient insects.

Nandakishore Rajagopalan, Illinois Sustainable Technology Center

### ***ISTC: Many Facets, Single Focus***

The Illinois Sustainable Technology Center promotes sustainable practices within Illinois and beyond through research, tailored technical assistance and public engagement. This presentation aims to provide a panoramic view of the activities of the Center with an emphasis on the unifying purpose.

Sallie Greenberg, ISGS/Advanced Energy Technology Initiative

### ***Pioneering Change from the Ground Up***

What do climate change, ancient oceans, and Illinois have in common? Together they are helping to bridge the gap between our current energy needs and environmental concerns. Through the research efforts of the Advanced Energy Technology Initiative, the ISGS is taking the lead in demonstrating the viability of carbon capture and storage.

## Poster Authors, Titles, and Abstracts

1. Susan Braxton, OED

### ***Merging Library Collections and Services at the Prairie Research Institute***

Over the past 3 years, the librarians of the Prairie Research Institute have added more than 20,000 titles to the University Library catalog from the ISGS, ISTC, and ISWS collections and moved more than 7,000 items to the Prairie Research Institute Library. In addition to the progress on evaluating, cataloging, and merging the Survey library collections, we have made many new acquisitions (print and online) with the University Library's Natural History fund and John Bouseman INHS Library Endowment, supported Institute research with our reference and instruction services, served on Institute committees and projects, promoted Institute research with staff bibliographies for each of the five Surveys as well as a variety of other web content, worked with the University Library on digitization of content from our collections, and helped to preserve and promote Institute publications and reports through the University of Illinois' institutional repository, IDEALS.

2. William Roy, ISGS

### ***Geochemical and Mineralogical Investigations of Carbon Sequestration in the Illinois and Michigan Basins: Reaction Experiments***

Geological sequestration of carbon dioxide is one of the most feasible approaches to mitigating greenhouse gas-induced global climate change while maintaining the current fossil fuel-based economy. With funding from the U.S. Environmental Protection Agency (Science To Achieve Results (STAR) Program and the U.S. Department of Energy, we are conducting laboratory-scale studies on the geochemistry and mineralogy of carbon sequestration in the Illinois and Michigan Basins. These investigations are on-going, and brine and rock samples are currently under study using conventional electrodes, ion chromatography and inductively coupled argon spectrometer for the liquid samples, and X-ray diffraction, scanning electron microscopy-energy dispersive X-ray, and plane-light microscopy, and cathodoluminescence to characterize the mineralogy and petrography of the rock sample before and after exposure to super-critical carbon dioxide and brine and formation pressures and temperatures.

3. George Geatz, INHS

### ***Plant Nutrient Availability and Soil Organic Matter Decomposition Response to Prescribed Winter Burns in Mid-Atlantic Tidal Marshes***

Prescribed winter burning is a commonly used management practice in coastal marshes along the Atlantic Coast to manage wildlife habitat, reduce fuel loads, and facilitate hunting and trapping activities. I conducted a manipulative field study to explore the mechanisms by which fire increases plant productivity. I found that prescribed fire does not provide a fertilization effect for vegetation through ash deposition due to the low amounts of nutrients in ash, and by modeling biomass nutrient stocks in other marshes with similar vegetation types showed that this lack of a fertilization effect likely exists across all coastal marsh types.

4. Molly Woloszyn, ISWS

### ***The Midwestern Regional Climate Center***

In its 24 years at the Water Survey, the Midwestern Regional Climate Center (MRCC) has monitored the climate of the Midwest, and provided users and decision-makers with

climate data and information for the nine-state region. We have the expertise to provide climate data from a variety of sources and to develop practical applications of climate information on issues ranging from agriculture to risk management to water resources. Our applied research helps explain the climate of the region and its impacts on the Midwest.

5. Eve Hargrave, ISAS and Nancy Holm, ISTC

### ***Naturally Illinois Expo 2012: Bringing Science Education to the Community***

The 4th annual Naturally Illinois Expo was held on March 9-10, 2012. The event each year showcases current scientific research and activities conducted throughout the Prairie Research Institute at the University of Illinois: the Illinois State Archaeological Survey, the Illinois Natural History Survey, the Illinois State Geological Survey, the Illinois State Water Survey, and the Illinois Sustainable Technology Center. Two hundred Institute scientists were on hand to help visitors learn about the importance of conserving natural and cultural resources, why the public needs to be aware of environmental issues, and how they can help to minimize the impact of humans on the environment. In addition to providing teachers and families with needed resources and opportunities to engage students in science and creative activities, the Expo exposes students to the wide variety of career opportunities in science.

6. Nancy Holm, ISTC

### ***Overview of ISTC's Sponsored Research Program***

Over the past 25 years, the Sponsored Research Program at the Illinois Sustainable Technology Center has funded over 230 research projects. Researchers from across Illinois and the Midwest have been supported to conduct studies on a number of environmental and pollution prevention issues relevant to the state of Illinois and its citizens. Current projects for FY12-13 and preliminary results will be described.

7. Sarah Wisseman, ISAS

### ***New Findings on a Roman Period Egyptian Mummy at the University of Illinois***

An Egyptian mummy studied non-destructively in 1990 was re-CT scanned in March 2011 at Carle Hospital to determine whether advances in medical imaging could reveal more about the young child inside the wrappings. The results provide clearer images of damage to the body and embalming practices during the Roman Period.

8. Jeffrey Levensgood, INHS

### ***Contaminants of Concern in Illinois Large River Mussel Populations***

We examined concentrations of selected elements and organic compounds in several species of mussels from the Illinois and Mississippi River confluence area. We noted differences among species and locations for some analytes. This information could be used to design a more comprehensive study including additional mussel species, a more focused examination of environmental media and a broader spatial scale.

9. Dale McElrath, ISAS

### ***Projectile Points of Illinois***

This poster highlights the many varieties of prehistoric hafted bifaces that are typically found in Illinois agricultural fields and river valleys. The many distinctive varieties of rock types that were used to make chipped stone projectile points are highlighted along with their suspected age and cultural affiliation.

10. Zohreh Askari, ISGS

***Assessing the Reservoirs and Seals Potential of the Cambrian & Ordovician Knox Group in the Illinois Basin for CO<sub>2</sub> Sequestration***

To determine lateral and vertical lithologic variations of the rocks within the Knox Group that could serve as reservoir or seal for CO<sub>2</sub> storage, a number of deep wells from the Illinois Basin were examined in detail. Well cuttings and available cores of these wells and samples from exposures in west-central Missouri were studied in detail and the results were compared with geophysical logs. The results show that the Knox Group in the Illinois Basin and adjacent Midwestern regions may be an attractive target for CO<sub>2</sub> sequestration because these rocks are 1) laterally extensive, 2) consist of some porous and permeable dolomite and sandstone intervals, and 3) contain abundant impermeable shale and carbonate seals.

11. Mark Branstner, ISAS

***Bottled in Illinois: Embossed Bottles and Bottled Products of Early Illinois Merchants from Chicago to Cairo 1840-1880***

Despite the significance of bottled food, beverage, and pharmaceutical products to the nineteenth century inhabitants of Illinois, reliable information relating to their production, distribution, and use has been severely lacking. In response, researchers associated with the Illinois State Archaeological Survey undertook a multi-year study to acquire detailed information on bottle styles, their embossed lettering, and contents, in addition to histories of the Illinois bottlers who used them. The resulting book describes and illustrates nearly 1,100 different Illinois embossed-bottle varieties produced before, during, and after the Civil War for close to 500 Illinois merchants operating in over 100 small towns and cities across the state.

12. Thomas Holm, ISWS

***Biochar and Polycyclic Aromatic Hydrocarbons (PAHs)***

Biochar, a byproduct of biofuel production, could be a valuable soil additive and a way to sequester carbon. However, it contains carcinogenic PAHs, which may limit its use. We are characterizing how tightly biochar binds PAHs and the bioavailability of these compounds.

13. Michael Farkas, ISAS

***Exploring Illinois Prehistoric Mounds Through LiDAR***

With the increasing availability of airborne LiDAR data, Archaeologists now have the opportunity to remotely resurvey and evaluate the condition of prehistoric earthworks. Primarily utilizing data provided through the Illinois Height Modernization Program, The Illinois State Archaeological Survey has started the process of reexamining many of 9000+ prehistoric earthen mounds located throughout the State. Refining the location and condition of these protected sites provides critical information for both preservationist and development communities.

14. Dee Lund, ISGS

***Illinois Height Modernization Showcase of LiDAR Data Applications***

As part of the Illinois Height Modernization Program, project team members are documenting real-world uses of Illinois LiDAR data. Projects address highway engineering, flood prediction, agricultural land management, mining subsidence, monitoring archaeological features, locating sinkholes, and applied geologic science.

15. Joan Crockett, ISGS

***Kickapoo Geology Field Trip For 5th Grade Students in Champaign Unit 4 Schools***

This fall, we will run six one-day geology field trips to reach all the 5th grade Champaign Schools students (over 700 students) as part of a curriculum-based science unit. The pilot project was funded in part by a public engagement grant from the University of Illinois and the Illinois State Geological Survey, with the goal of engaging students in an outdoor field science experience, while meeting state earth science education standards. The age-appropriate field guide may be used by others, such as school groups, families, scout groups, and the public for self-guided tours.

16. Hong Wang, ISGS

***Optically Stimulated Luminescence (OSL) dating on Illinois loess***

The OSL dating is an ideal technique for aeolian (wind blown) sediments. However, our newly established OSL dating lab focuses on aeolian dune sand, which is an easier task. Here we show preliminary dating results on Illinois loess (wind blown silt) deposits.

17. Xiaodong Miao, ISGS

***Using OSL and Radiocarbon Dating to Constrain the time of soil development***

Soil development time is theoretically defined as the time elapsed since the parent materials were deposited and subaerially exposed, according to Jenny's model, but in many environments the soil ages have not been practically calculated. We propose that the best method for estimating the time of soil development is subtraction of the Pyrolysis-Volatile (Py-V) <sup>14</sup>C dates of soil's uppermost A horizon from OSL dates of C horizon of parent material. We tested this new approach in four scenarios: 1. Modern soil developed downward in loess, 2. Soil develops while loess aggrades, 3. Soil formed in dune sand, 4. A counterexample shows that simple subtraction is not always appropriate.

18. Don Keefer, ISGS

***Earth Systems Visualization Laboratory: A Collaborative, 3-D Visualization Resource at the University of Illinois***

The Earth Systems Visualization Laboratory at the Illinois State Geological Survey is a high-resolution, immersion visualization lab providing a collaborative viewing space with third party and custom software applications. The lab is an excellent place for individual researchers and small research teams to explore and discuss multidisciplinary research. While current visualization software targets earth science applications, the lab features active stereo capabilities and the flexibility to load additional software to meet researcher needs. The lab is available for use by all University of Illinois faculty, staff and graduate students.

19. Joy Scrogum, ISTC

***Sustainable Electronics Initiative (SEI) & International E-Waste Design Competition***

The Sustainable Electronics Initiative (SEI) is dedicated to the development and implementation of a more sustainable system for designing, producing, remanufacturing, and recycling electronic devices. SEI is geared toward conducting and sponsoring research, as well as integrating principles of sustainability into the curricula and educational experiences of engineers, industrial designers, computer scientists and others involved in the design, manufacture, and consumption of electronic products. The International E-Waste Design Competition is an educational initiative of SEI in which participants from

around the world submit ideas for reusing e-waste components to create appealing new products, or for products or services which will result in reduced generation of e-waste in the first place (e.g. an innovation to extend an electronic product's life cycle).

20. Kendall Annetti, INHS

***Avian Hemoparasites in Illinois and their Effects on Health***

Avian blood parasites are found in wild birds nearly worldwide but studies have not been conducted since 1957 in Illinois. In addition, avian hematozoa are thought to induce physiological stress, leading to decreased reproduction and health, although few studies have compared clinical health parameters from blood with protozoal infection. The objectives of this study are (1) to assess basic health parameters based on (plasma protein, white blood cell counts, packed cell volume, glucose, and hemoglobin) between infected and non-infected upland game and waterfowl and (2) to determine the type, prevalence, density and intensity of hematozoa under natural conditions.

21. Heath Hagy, INHS

***Ecology of Fall-Migrating Mallards in the Illinois River Valley***

The Illinois River Valley (IRV) provides important stopover habitat to spring- and fall-migrating waterfowl and characterization of migrating and wintering waterfowl habitat use is critical to guide conservation planning, habitat restoration, and harvest management. Using radio telemetry, we determined that the average minimum daily movement of 142 mallards (86 female and 56 males) along the middle Illinois River was 3.9 ± 0.2 km (n = 133), and mallards used open water (46%), flooded corn (16%), herbaceous wetland (11%), and wooded habitats (8.4%) most often during their 35-day average stay in the IRV. Thirty-one percent of marked ducks died during their stopover in central Illinois and most (77.3%) mortality was attributed to hunting, although we located mallards on wetlands available to hunting (i.e., non-refuge) for the majority (80.8%) of diurnal locations.

22. Sarah Wisseman, ISAS

***Close to Home? Pipestone Resource Utilization in the Midwest***

A team of archaeologists and geologists uses a shoebox-size PIMA (Portable Infrared Mineral Analyzer) spectrometer in provenance studies of stone Cahokia 'red goddess' figurines and Hopewellian pipes recovered from sites in the Midwestern United States. The data from this totally non-destructive method for determining mineral composition support earlier analyses by X-ray diffraction (XRD) and sequential acid dissolution-inductively coupled plasma (SAD-ICP) and confirm pipestone sources close to the artifact find-spots (Missouri for the figurines and northwestern Illinois for the pipes). The combined results are forcing archaeologists to reevaluate raw material procurement, artifact production, and redistribution for the Middle Mississippian (ca. A.D. 1000-1400) and Middle Woodland (ca. 50 B.C.-A.D. 250) periods.

23. Ed Heske, INHS

***Invasion of Illinois Bat Hibernacula by Geomyces destructans***

We are monitoring bat hibernacula in Illinois in anticipation of the invasion of *Geomyces destructans*, the fungus that causes white-nose syndrome. We use molecular and culture-based approaches to evaluate bats and hibernacula substrates for the presence of *G. destructans*, and describe microbial and fungal communities. We hope to better

understand potential competing or synergistic interactions between *G. destructans* and other components of fungal and microbial communities on bats and in hibernacula.

24. Jerrod Parker, INHS

***Long-term Taxonomic and Functional Diversity Changes of Illinois River Fish Assemblages***

Illinois River fish assemblages have been monitored on a nearly continuous annual basis since 1957 utilizing a standardized electrofishing effort at 26 fixed locations. During this time period political mandates (e.g., 1972 Clean Water Act), species introductions, and land use changes have dramatically affected the structuring of these assemblages. This study investigates fish assemblage taxonomic and functional trait responses to contemporaneous water quality and discharge trends.

25. Trisha Rentschler, ISGS

***The Application of Remote Sensing in the Harrisburg Disaster***

After a devastating EF4 tornado (wind speeds from 166-200 mph) struck the city of Harrisburg in southeastern Saline County, Illinois, the Illinois Department of Transportation acquired aerial photography and partnered with students at Eastern Illinois University to process the imagery. Once processing was complete, the geometrically corrected images were then forwarded to the U.S. Geological Survey, Center for Earth Resources Observation and Science, and placed onto the USGS Hazards Data Distribution System.

26. Wei Zheng, ISTC

***Environmental Fate of Pharmaceuticals and Personal Care Products (PPCPs) and Steroid Hormones in Reused Water***

The widespread occurrence of pharmaceuticals and personal care products (PPCPs) and steroid hormones in the environment has been recognized as a critical and emerging environmental issue. Wastewater effluent from sewage treatment plants (STPs) and concentrated animal feeding operations (CAFOs) have been identified to be major sources discharging these emerging contaminants to the surrounding watersheds. This study addresses the environmental fate of pharmaceutical and hormone contaminants in reused water related to STPs and CAFOs.

27. Barbara Stiff, ISGS

***A Landscape History: the Ancient Mississippi River in Illinois***

To the trained eye the fact that Illinois has been repeatedly visited by continental glaciers is apparent, to the untrained eye most of the state is topographically and materially subdued ... OK, flat and boring. As part of the Illinois Prairie Institute annual Open House in March, the ISGS Quaternary Geology Section provides 'hands-on' activities to generate enthusiasm for an ancient landscape and the distribution of geologic materials that are the framework upon which we work, live, and play.

28. Bill Dey, ISGS

***Collaborative Research for Modeling Complexities of the Mahomet Aquifer: Examples from East-Central Illinois***

The Mahomet aquifer is the primary source of water for nearly 1 million people in central Illinois. Ongoing geological, hydrological, and geophysical studies by researchers from the Prairie Research Institute have provided updated information on the aquifer that has

allowed more detailed models of its geology and hydrology. These revised models are critical for the future management of water resources in this region.

29. Drew Phillips, ISGS

***Spatial Error in Well Logs for Geologic Mapping: Are There Consequences to Being Wrong?***

Archived well log records comprise the main source of subsurface information for geologic mapping in Illinois, but their locations and elevations are typically uncertain. We spend a lot of time confirming and often relocating well locations, but does it matter? This study demonstrates that at regional scales, the consequences of inaccurate locations and elevations are relatively minor, but become significant at larger scales.

30. Xinying Wang, ISTC

***Forward Osmosis Sea Water Desalination***

Forward Osmosis, taking advantage of natural osmotic pressure gradient for water treatment, is a technology which could desalinate sea water at a lower cost and a higher recovery. Our research is on developing and validating a Forward Osmosis desalination process. I will talk about the basic idea of our project, the challenges we are facing, and the progress we have made.

31. Massimo Pessino, INHS

***Postglacial History of an Eastern North American Aquatic Insect, *Acroneuria frisoni* Stark & Brown (Plecoptera: Perlidae)***

The Illinoian and Wisconsinan glacial episodes deeply influenced the distribution and genetic structure of most North American animals and plants. In this study, the demographic history of the stonefly *A. frisoni* was analyzed using variation in the mitochondrial gene cytochrome oxidase I. Results indicated that populations survived in glacial refugia located in the southern states west of the Appalachians through the Cumberland Plateau in Kentucky and Tennessee and in the Ozark Mountains of Missouri and Arkansas. Western and central Tennessee populations were most responsible for the repopulation of the Midwest, while Eastern Tennessee populations appear to have mostly recolonized the Northern Appalachian through one or more bottleneck events. Ozark populations have been largely isolated since before the last glacial episodes. Knowledge of the present genetic makeup of *A. frisoni* populations is the basic step toward assessing the species conservation needs and is fundamental for predicting its capacity of coping with natural or human induced environmental changes.

32. John C. Marlin, ISTC

***The Illinois Mud to Parks Program: Returning the Soil to the Land***

Sediment is clogging reservoirs, ponds and river features across the globe eliminating water supply capacity and destroying aquatic habitat and recreational opportunities. Removing suitable sediment and returning it to the land for beneficial uses helps address this problem. The Illinois Mud-to-Parks program has provided sediment derived topsoil to several locations including a Chicago steel mill site being converted to parkland.

33. Stephanie Liss, INHS

***Nutrition and Condition of Invasive Silver Carp Across Large Illinois Rivers: Can Stress and Nutrition Influence Establishment?***

Invasive species are of worldwide concern as their establishment in non-native habitats may have negative influences on native biodiversity and ecosystems. Bighead (*Hypophthalmichthys nobilis*) and silver carp (*H. molitrix*) (collectively known as Asian carp) were intentionally introduced to the United States in the early 1970's and are currently distributed throughout the Mississippi River Basin (MRB). We tested for differences in physiological stress and nutritional parameters among silver carp populations within four large rivers of Illinois (Illinois, Mississippi, Ohio, and Wabash) that vary in ecosystem characteristics. The goal of our study was to test whether physiological stress and nutritional parameters could be used as indicators of habitat suitability for Asian carp establishment.

34. T.D. VanMiddlesworth, INHS

***Relative Abundance and Feeding Habits of Bowfin, Spotted Gar, and Largemouth Bass at The Nature Conservancy's Emiquon Preserve and Reelfoot Lake: Can Native Fish Species Control Invasive Common Carp?***

We sampled Reelfoot Lake in 2011 to understand why it has not become dominated by common carp *Cyprinus carpio*. Our bowfin *Amia calva*, spotted gar *Lepisosteus oculatus*, and largemouth bass *Micropterus salmoides* diet analyses suggest they may not select for common carp as a prey type. This suggests that these species may not be directly influencing common carp through predation, but indirectly through other pathways.

35. Kelly Estes, ISGS

***The Illinois Cooperative Agricultural Pest Survey Program - Safeguarding U.S. Agricultural and Environmental Resources through Invasive Species Surveys***

The Illinois Cooperative Agricultural Pest Survey program is a joint effort between several state and federal agencies, including the Illinois Natural History Survey, Illinois Department of Agriculture, and USDA-APHIS-PPQ. Its primary objective is to safeguard our nation's food and environmental security from invasive pests that threaten our production and ecological systems. This program focuses on state surveys of harmful or economically significant exotic plant pests, diseases, and weeds that have eluded first-line of defense inspections.

36. David Grimley, ISGS

***Surficial Geology of the Valmeyer Quadrangle, Monroe County, IL***

This surficial map of the Valmeyer Quadrangle portrays diverse geology and geomorphology across an area that straddles the terminal limit of the Illinois Episode glaciation (~ 150,000 years ago). The map includes high relief, loess-covered bedrock uplands, with widespread karst topography, as well as a several mile wide segment of the Mississippi River valley. Of special note: this area was devastated by the 1993 flood, after which the town of Valmeyer was moved 350 feet higher from the floodplain to the karstic uplands.

37. Seyed Dastgheib, ISGS

***Energy and Environmental Technology Innovation at the Applied Research Laboratory***

Chemical and environmental engineers at the Applied Research Laboratory (ARL) of the Illinois State Geological Survey, a division of the Prairie Research Institute at the University of Illinois at Urbana-Champaign, use a multi-disciplinary, team-based approach to plan, develop, and perform integrated applied research with the goal of developing clean energy and environmentally sustainable technologies. Current ARL activities include developing technologies for capturing CO<sub>2</sub> and controlling mercury and acid gas emissions from coal

combustion flue gases, water-energy nexus, and multi-functional environmental sorbents. During the past five years, the average annual external funding, from the US Department of Energy, Illinois Clean Coal Institute, Electric Power Research Institute, and industry, has been about one million dollars. ARL staff collaborate with faculty members and support and co-advise graduate and undergraduate students at UIUC.

38. Jennie Atkins, ISWS

***Monitoring the Drought with the Illinois Climate Network***

The Illinois Climate Network (ICN) with its 19 stations across the state and hourly measurements of precipitation, soil moisture, and groundwater levels is uniquely situated to monitor climatological events such as the drought of 2012. The large coverage area allows researchers to see the impacts across the state as well as identify more localized effects. The variety and frequency of data collected through the network provides researchers with the opportunity to gain a more complete picture of drought effects.

39. James Zahniser, INHS

***Reclassification of the Leafhopper Subfamily Deltocephalinae (Hemiptera: Cicadellidae) With Emphasis on the Polyphyletic Tribe Athysanini***

Based on the results of recent phylogenetic analyses and morphological examination of numerous representative species, the classification of the largest leafhopper subfamily, Deltocephalinae (37 tribes, 951 genera, 6634 species) is revised. An online searchable database and interactive key to tribes and subtribes is presented.

40. Benjamin Beas, INHS

***Effects of Sediment Removal on Vegetation Communities in Rainwater Basin Playa Wetlands***

Within the Rainwater Basin region of south-central Nebraska, thirty-four wetlands were sampled in 2008 and 2009 among three land use categories: native grassland (reference), restored, and cropland. Results showed that: 1) reference, restored, and cropland wetlands are dominated by differing plant species and guilds and; 2) restored wetlands do not appear to be on trajectory to reach reference wetland status following restoration. This may be attributed to differing seed bank communities between reference and restored wetlands, dispersal limitations of perennial plant guilds associated with reference wetland conditions, and/or management activities may be preventing restored wetlands from reaching reference status.

41. B.K. Sharma, ISTC

***Thermo-chemical Conversion of Waste to Renewable Crude Oils and Biochar***

The thermo-chemical process will be explained to show its usefulness in converting waste materials (plastic and spent tires), waste lipids (soapstock, trap grease, waste fryer oil, animal fat) and biomass (defatted algae, defatted seedcakes, lignins, corn stover) to renewable crude oils, fuels and biochar.

42. Kevin Cummings, INHS

***Freshwater Mussel Studies in Zambia 2005-2008***

In 2005, 2007, and 2008, we sampled various localities for freshwater mussels (Mollusca: Bivalvia: Unionoida) from several localities around the eastern half of Zambia. In addition to our own fieldwork, we have examined the holdings of various research collections in the

United States and Europe. The material we have acquired thus far has been useful not only for substantiating the Pan-African distributions of the 24 species of the Upper Congo and Upper Zambezi basins but also for testing hypotheses of evolutionary relationships among the freshwater mussels of Africa, South America, and Eurasia.

43. Jason L. Robinson, INHS

***Reconstructing Historical Patterns of Stonefly (Insecta: Plecoptera) Diversity with Species Distribution Modeling***

Animal distributions have changed dramatically within the Midwest during the 20th century. Stoneflies are sensitive to changes in water quality and habitat structure and the majority have lost range due to agriculture and urban development. Our approach to reconstructing their ranges uses 28,600 museum specimen records, ~100 environmental variables, and Maximum Entropy species distribution models to predict presettlement range and species richness patterns across IL, IN, MI, OH, and WI.

44. Marilyn Beckman and Lesley Deem, INHS

***Species File Software: A Foundation for Taxonomic Database Development***

The Mission of the Species File Software Group is to provide software and services to taxonomists studying the Earth's biodiversity. We do this mainly through our Species Files online catalogs, but also through the construction of taxonomic workbenches, collaboration and consultation with taxonomists on proposals needing biodiversity informatics help, and through tackling use cases posed by the taxonomic community.

45. Junhua Jiang, ISTC

***Bifunctional Formate Fuel Cell for CO<sub>2</sub> Utilization and Energy Storage-Conversion***

To cost-effectively convert carbon dioxide (CO<sub>2</sub>) utilizing renewable energy into infrastructure-compatible liquid fuels and to utilize the fuels in a more efficient and environmental-friendly manner will be an ultimate solution to address global warming and energy production concerns. An innovative bifunctional formate fuel cell (BFFC) which integrates the function of a direct liquid fuel cell and an electrolytic cell in the same device has the potential to achieve this goal.

46. Jane E. Johnshoy Domier and Donald E. Luman, ISGS

***LiDAR Landscapes of Illinois***

The Illinois Height Modernization Program is a statewide initiative to collect detailed elevation information using state-of-the-art LiDAR technology. LiDAR (light detection and ranging) technology is an active remote sensing technique which uses a pulsating laser sensor to scan the Earth's surface. The reflected light pulses are detected by instruments that record their location in three dimensions, which then can be used to create a three-dimensional view of the land surface. This surface topography map was created to showcase how LiDAR data is being used to better interpret the physical landscape of Illinois.

47. Samantha Carpenter, INHS

***Advances in Technology to Study River Otters: Fusing Field Biology and Engineering***

Researchers from the Illinois Natural History Survey are collaborating with undergraduate students in the UIUC Electrical and Computer Engineering Senior Design course (ECE 445) to develop technology for the study of river otters. Students developed a subcutaneous GPS implant, a terrestrial PIT tag monitoring system, a digital tracking plate, and a wirelessly triggered camera system.



**NOTES**

**NOTES**

## Upcoming Events

October 24, 2012

Prairie Research Institute Lecture Series

Andrew Revkin, Dot Earth Blogger for *The New York Times* and Senior Fellow at Pace University

### **9 Billion People + 1 Planet = ?**

How new ways to share and shape ideas can help build durable progress on a crowding, polarized, finite planet

After two centuries of explosive growth, the planet's human population is widely seen as cresting within the next couple of generations. A mid-range best guess for the peak remains roughly 9 billion people. There are even signs that resource-sapping activities will hit a peak as well. But there are a host of unanswered questions: Will we overheat or innovate, conserve or despoil, crash or round the curve with a few scrapes? Andrew Revkin will present an optimistic, but realistic, exploration of ways to share and shape ideas that can foster progress on a finite planet.

4:00 p.m. Lecture, 5:00 p.m. Reception

Alice Campbell Alumni Center, 601 South Lincoln Ave, Urbana

November 30, 2012

### **Prairie Lightning Symposium**

9:00 a.m. – 4:00 p.m.

I Hotel and Conference Center, 1900 South First Street, Champaign

Join colleagues from the Prairie Research Institute for a day of "lightning" talks, posters, and networking in a fun, fast-paced setting.

March 8-9, 2013

### **Naturally Illinois Expo**

Natural Resources Building, 615 East Peabody Drive, Champaign

9:00 a.m. – 3:00 p.m.

The fifth annual Expo will feature more than fifty exhibits, demonstrations, and hands-on science activities for the public, teachers, and students of all ages. It provides an opportunity to talk with scientists from the State Scientific Surveys who work on solutions to water, energy, climate, ecosystem, technology, and cultural resource issues.

*The Prairie Research Institute Lecture Series and Naturally Illinois Expo are made possible by generous donors to the Expo/Lecture Series Fund. To find out more or to donate, visit [prairie.illinois.edu/expo](http://prairie.illinois.edu/expo).*

Special thanks:

Lighting Talk Presenters

Poster Presenters

#### **Prairie Lightning Symposium Committee**

Dick Berg, ISGS  
George Czapar, ISWS  
Julie Dyar, ISTC  
Eve Hargrave, ISAS  
Jeff Hoover, INHS  
Kevin Johnson, INHS  
Libby Johnston, OED  
Laura Keefer, ISWS  
Beth Luber, ISTC  
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#### **Volunteers**

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Stephanie Daniels, ISAS  
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